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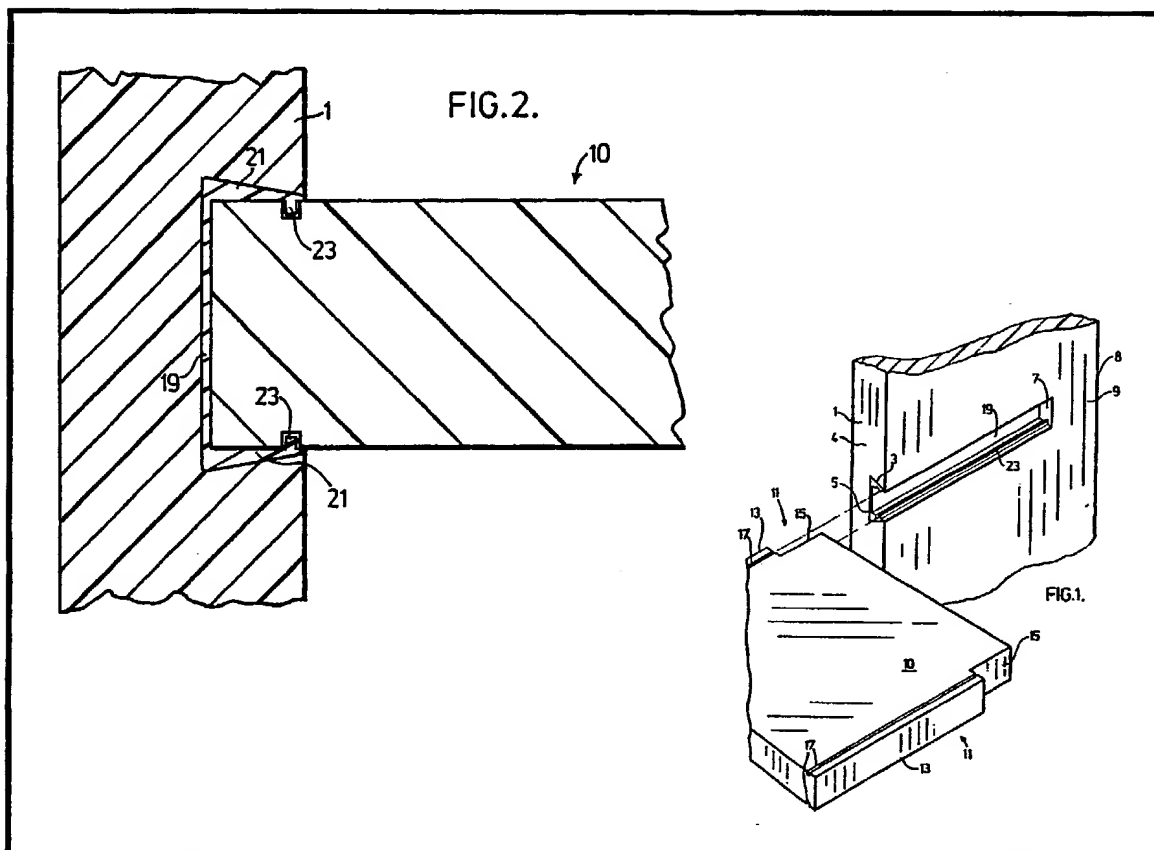
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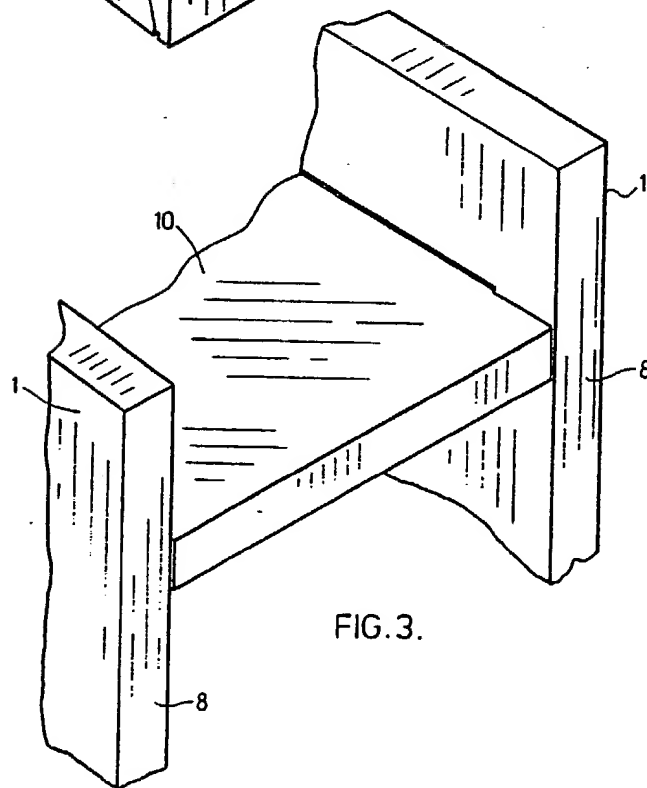
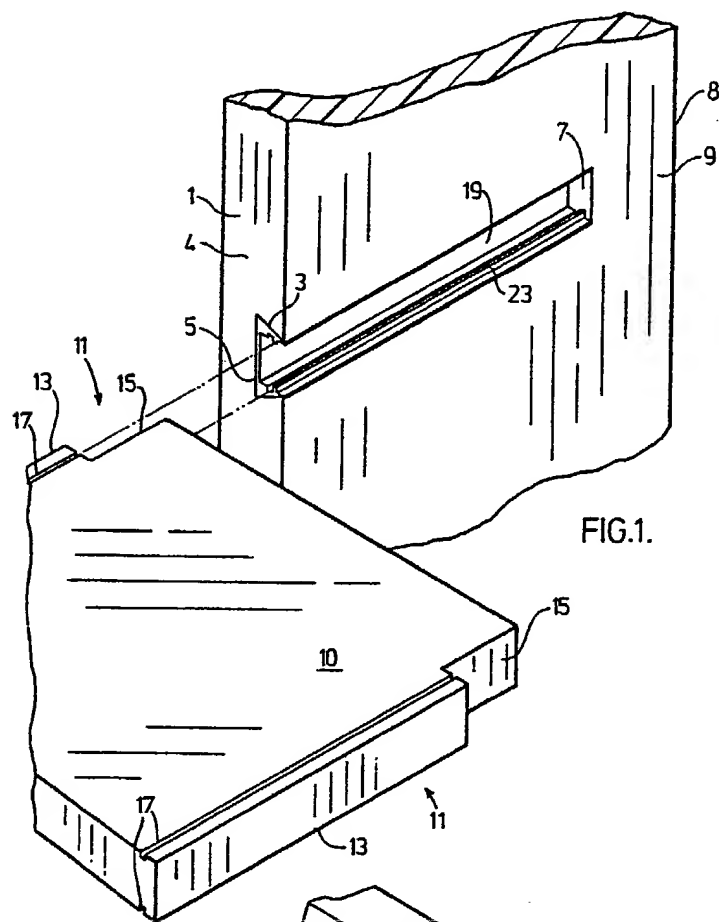
(54) Panel jointing system

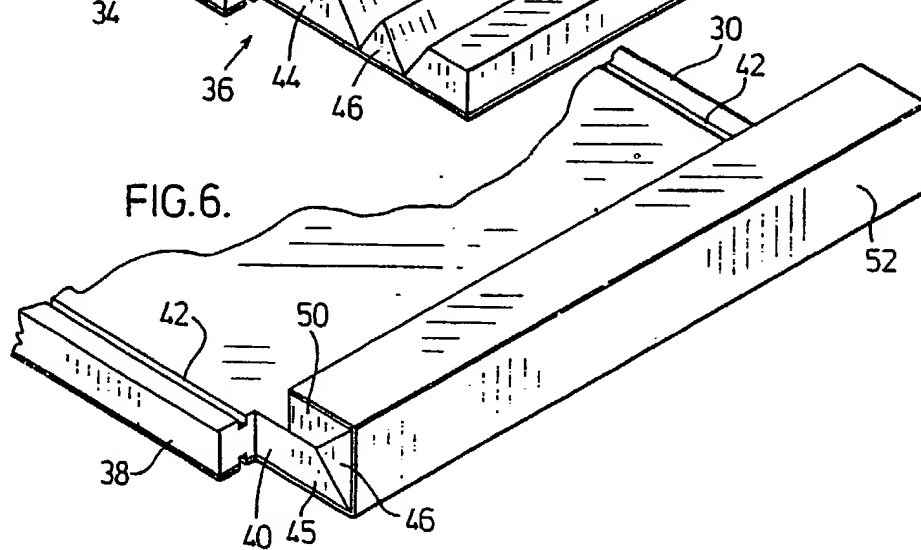
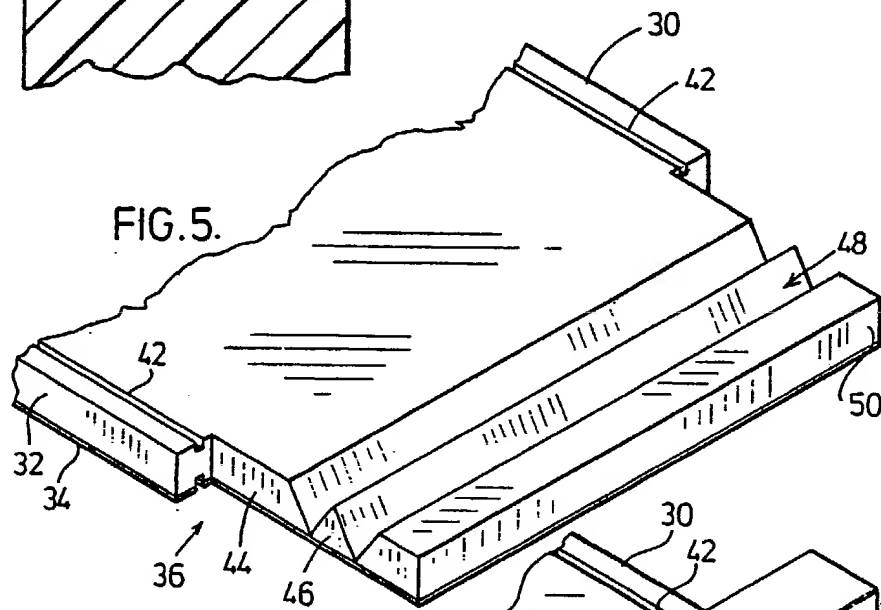
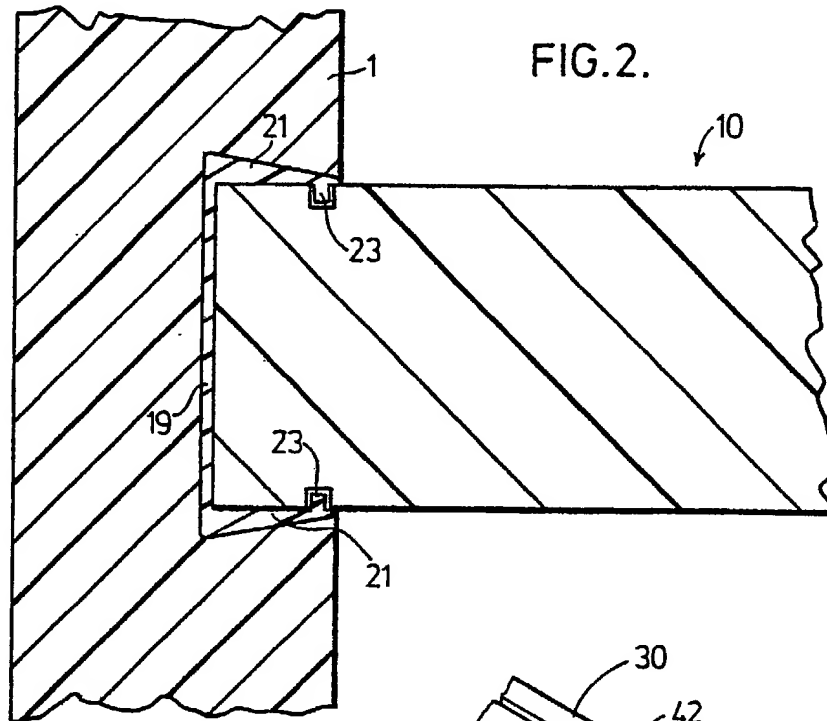
(57) The jointing system of the present invention joins two panels 1, 10 to one another at right angles with the mounting edge 11 of the panel 10 engaged in an under-cut groove 3 provided in the mounting surface of the panel 1 and held there by a third piece comprising a channel section 19 contoured to conform to the shape of the said groove 3 and said mounting edge 11, and cancelled from view.



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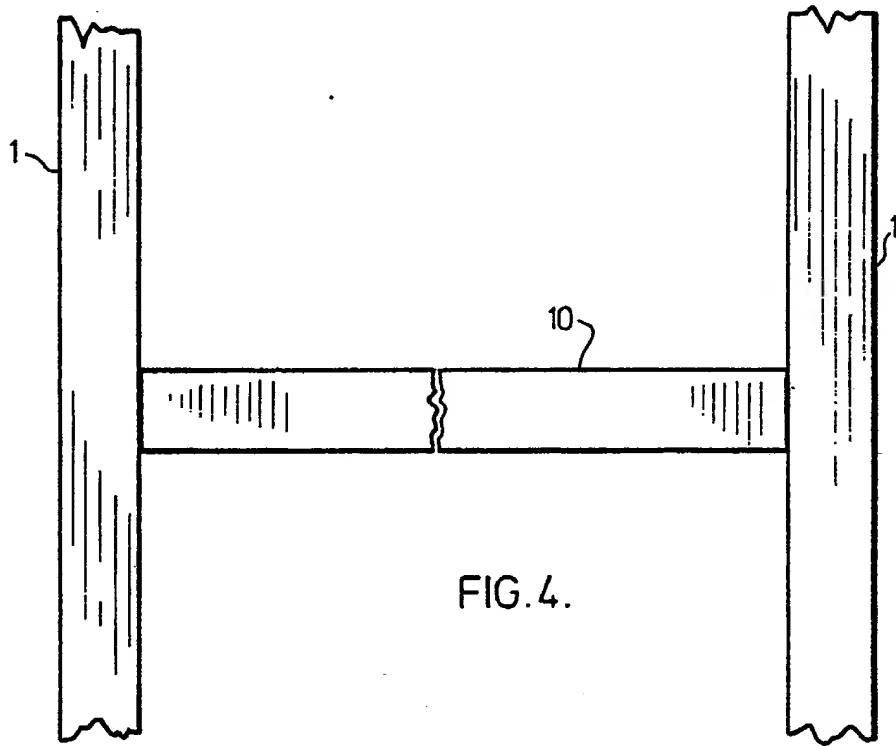


FIG. 4.

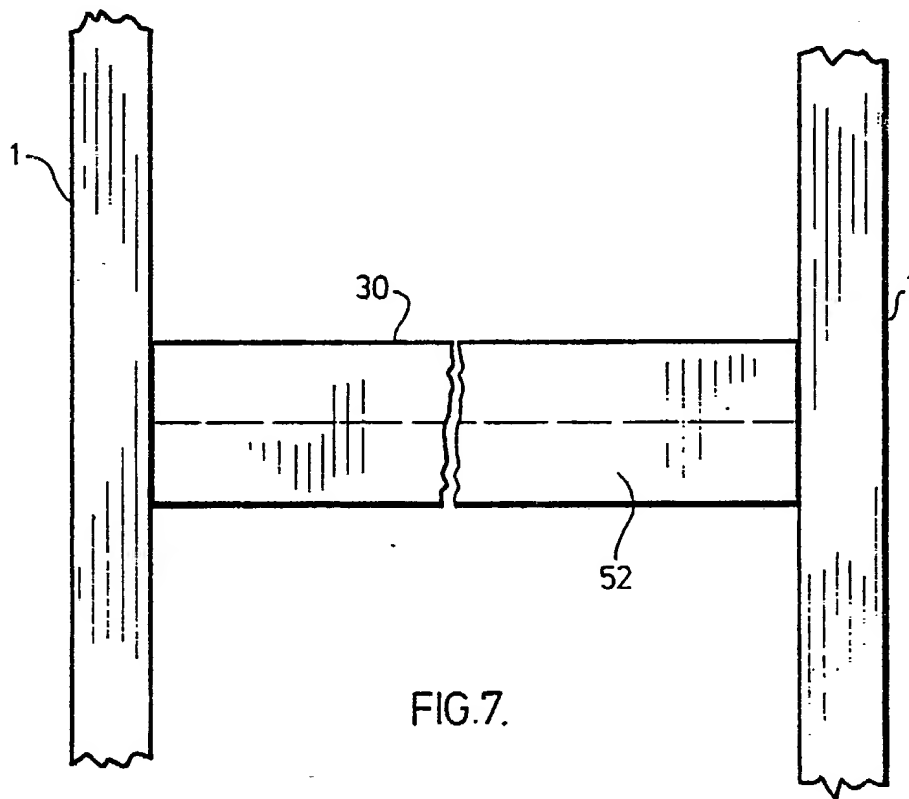
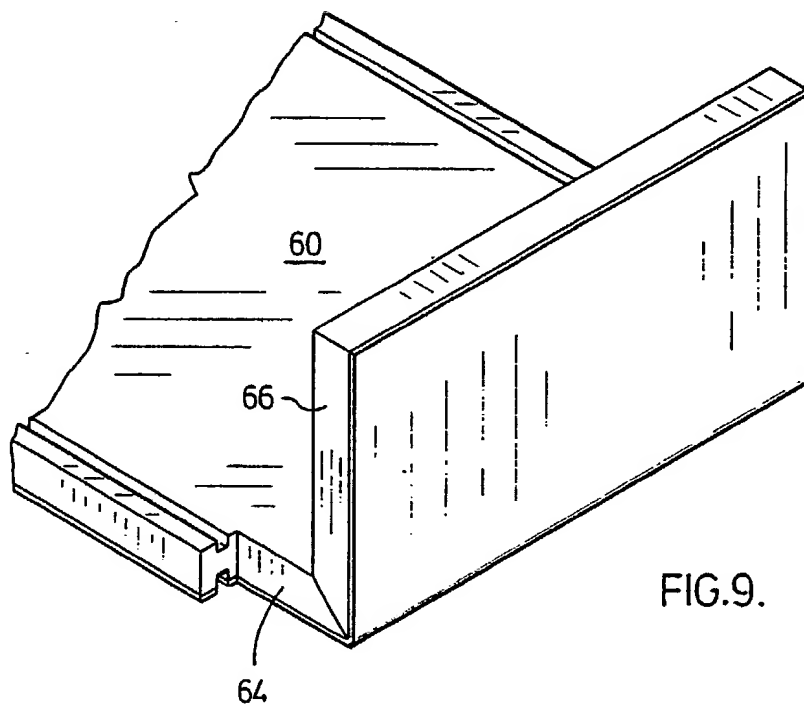
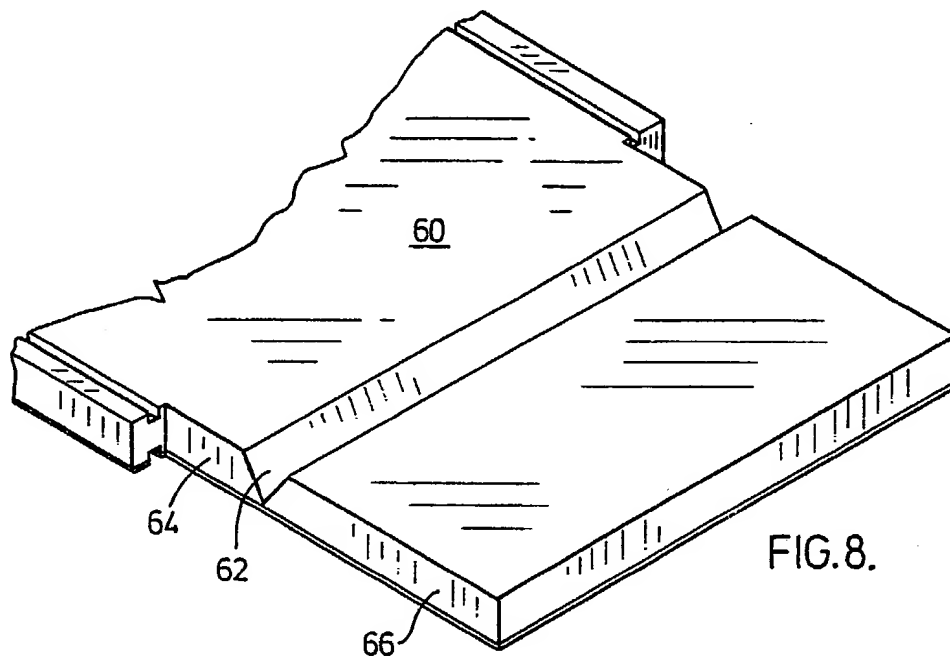


FIG. 7.



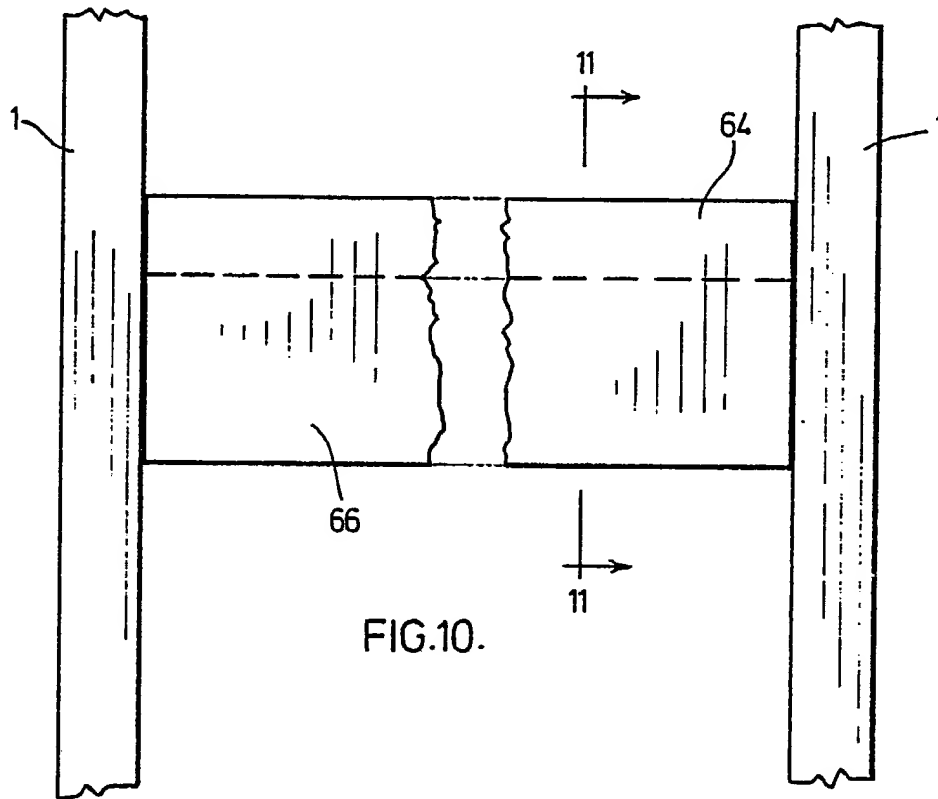


FIG.10.

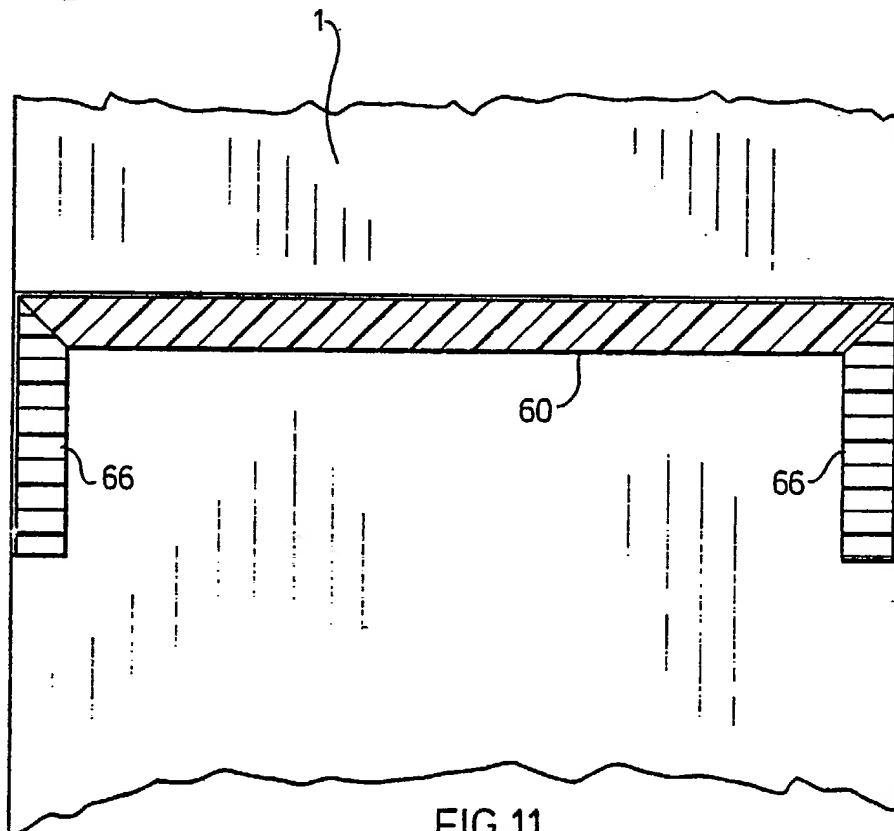


FIG.11.

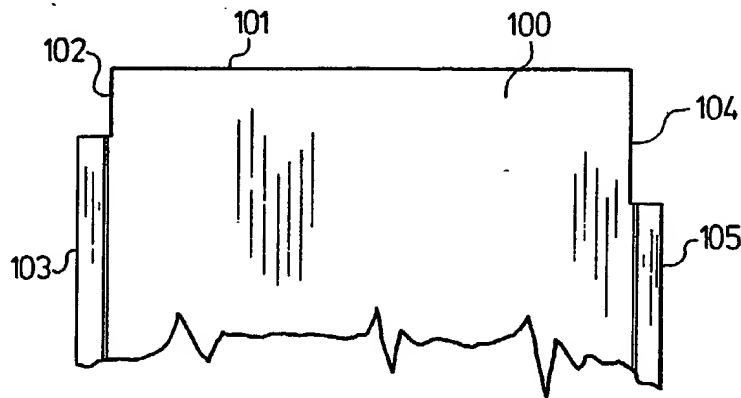


FIG. 12.

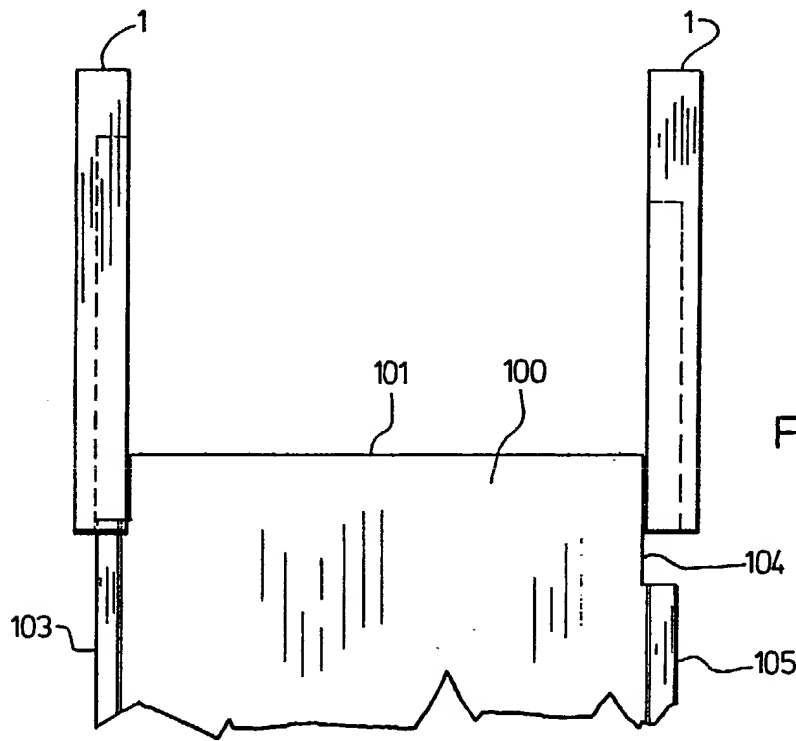


FIG. 13.

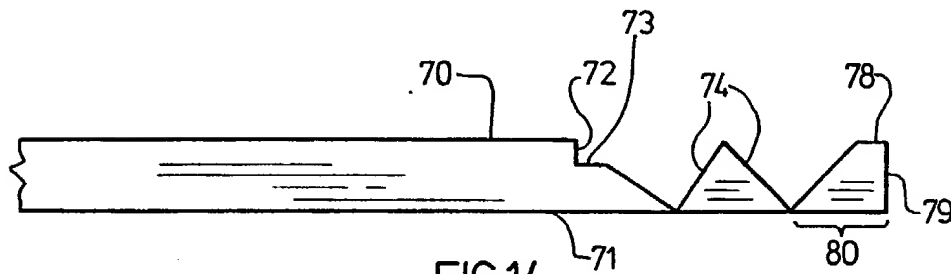


FIG. 14.



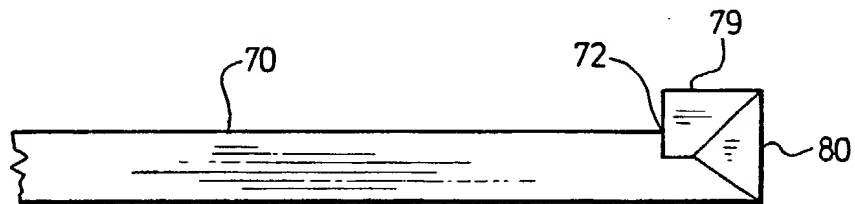


FIG. 15.

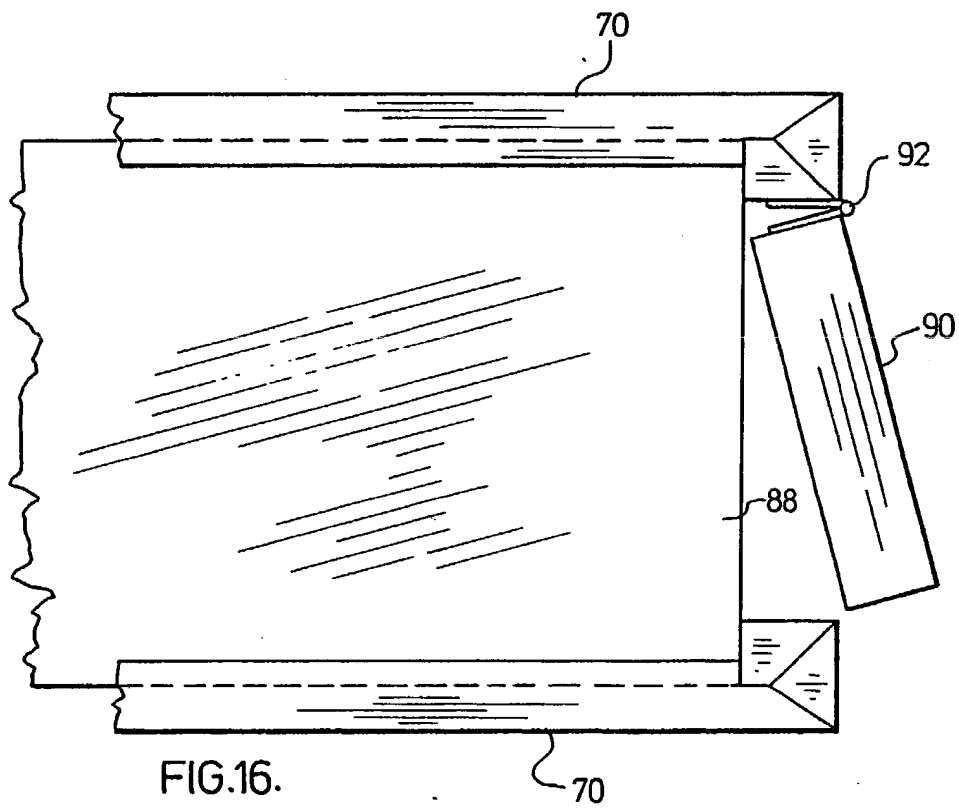


FIG. 16.

## SPECIFICATION

## Panel jointing system

5 The present invention relates to a panel jointing system specially adapted for use in finished furniture joints.

Conventional panel jointing systems rely upon two upright end panels to support a cross panel therebetween. Such a system is shown in Swiss Patent 457,757 wherein the individual end panels are only adapted to prevent up and down movement of the cross panel and will not prevent the cross panel from pulling away from the upright panel without the use of the second upright panel or securing screws and the like.

An exception to the conventional panel jointing system is disclosed in Canadian Patent 991,374 in which the mounting edge of the cross panel is countersunk in the mounting surface of the upright panel. The mounting surface is provided with a groove in which a channel section is secured. The channel section includes a pair of spaced arms which fit over the sides of the mounting edge. However each of these arms extends outwardly from the groove beyond the mounting surface and is clearly visible when the panels are joined to one another. Such an arrangement is acceptable for unfinished furniture but has its drawbacks for use in finished furniture.

The present invention provides a panel jointing system which is adapted to provide strong, clean panel joints particularly suitable for finished furniture. Furthermore, the panel jointing system does not require any tools for assembly and is therefore very easy for the consumer to work with.

40 The system includes a supporting panel having a mounting surface provided with an undercut groove, which is open only at one end and which extends across a major portion of the mounting surface to its blind end. The system further includes a cross panel having a mounting edge, which is secured in the blind ended groove by a channel section having an exterior shape conformed to the undercut shape of the groove. The channel section is provided with sidewall portions which clamp over the mounting edge. These sidewall portions are both such that when the two panels are joined to one another the channel section is essentially covered by the cross panel and hidden at the blind end of the groove to provide the clean looking joint required for finished panelling or furniture.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings wherein:

Figure 1 is an exploded rear perspective view showing a preferred form of supporting panel and cross panel according to the present invention.

65 Figure 2 is a rear end view of a panel joint

according to a preferred embodiment of the present invention.

70 Figure 3 is a front perspective view looking down on an assembled furniture piece according to a preferred embodiment of the present invention.

Figure 3 is a front perspective view looking down on an assembled furniture piece according to a preferred form of jointing system according to the present invention.

Figure 4 is a front view of the arrangement shown in Fig. 3.

80 Figure 5 is a perspective view looking down on the bottom side of a V grooved cross panel according to a preferred aspect of the present invention.

Figure 6 shows the V grooved cross panel of Fig. 5 when folded.

85 Figure 7 is a front view of an assembled unit incorporating the V grooved cross panel of Fig. 6.

Figure 8 is a perspective view looking down on the bottom side of a second cross panel V grooved according to the present invention.

90 Figure 9 shows the cross panel of Fig. 8 when folded at the V groove.

Figure 10 is a front view of a finished furniture piece using the cross panel of Fig. 9.

Figure 11 is a section view taken along the 95 line 11-11 of Fig. 10.

Figure 12 is a top view of a preferred arrangement of a keyed cross panel.

Figure 13 is a top view of the keyed cross panel of Fig. 12 being fitted into a pair of mounting panels.

100 Figure 14 is a top view of a preferred arrangement of a mounting panel including a special V-grooving.

Figure 15 is a top view of the panel of Fig. 105 14 with the V-grooves collapsed.

Figure 16 is a top view of a preferred assembly using a pair of mounting panels as shown in Fig. 15.

Referring to Fig. 1 and 2 the panel jointing system of the present invention, comprises a supporting panel 1, a cross panel 10, and a channel section 19.

The supporting panel is provided with a dove tail shaped groove 3 which is open as indicated at 5 at the rear end 4 of the supporting panel. The groove extends across a major portion of this supporting panel to its blind end 7. However, there is a small ungrooved panel portion 9 between the blind end and the forward edge 8 of the supporting panel.

The cross panel is provided with at least one and preferably two stepped mounting edges, one on either side of the cross panel which are generally indicated at 11. The stepped mounting edges consists of a minor forward step 15 and a major rearward step 13. Small grooves 17 are provided along the sides of the major rearward step of the mounting edge.

As can be best seen in Fig. 2 the channel section 19 comprises a pair of sidewall portions 21 each of which is provided with a small inwardly extending ridge 23 which extends along the length of the sidewall.

In order to assemble the unit to provide the joint shown in Fig. 2 the cross panel is slid small step first into the open end 5 of groove 3 such that sidewall portions 21 of channel section 19 clamp over major step 13 of mounting edge 11 with ridges 23 slideably engaging minor grooves 17 provided on the mounting edge.

The exterior shape of the channel section is contoured to conform to the dove tail shape of the groove so that it can only be withdrawn by sliding it longitudinally of the groove. The interior shape of the channel sections conforms to the exterior shape of the major step of the mounting edge to clamp it snugly within the groove. The cross panel is secured in the channel section as a result of the mating fit between ridges 23 and grooves 17, which again permit longitudinal sliding of the cross panel relative to the supporting panel but which will not permit the withdrawal of the cross panel by pulling it away from the supporting panel.

As can be seen in Figs. 3 and 4 the panel jointing system of the present invention provides an extremely clean and neat looking joint as required in finished furniture. The furniture piece shown in Figs. 3 and 4 includes a pair of identical supporting panels 1 and a single cross panel 10. However, as will be understood from the description above, only one of the supporting panels need be provided to support the cross panel. Furthermore, each supporting panel can independently support a plurality of cross panels such as might be found in open book shelves and the like.

The forward edge of cross panel 10 fits flushly with the forward edges 8 of the supporting panels 1 with the length of minor step portions 15 corresponding to the length of ungrooved panel portions 9 between the forward edges of the supporting panels and the blind ends of the grooves. Since the sidewalls of the channel section are substantially fully countersunk in the grooves, each of the channel sections is covered by the cross panel and hidden at the blind ends of the grooves at the forward face of the furniture piece. Furthermore, because the securing ridges 23 are located within the undercut groove they cannot be separated from one another to release the cross panel and since the groove has a dovetail configuration, the more the cross panel is pulled from the groove, the tighter the ridges clamp the mounting edge to secure the cross panel securely in position.

According to one aspect of the present invention, the mounting edge can be adapted to co-operate with the channel section in a

manner such that upon initial engagement between the two the fit is somewhat loose for ease of assembly and tightens substantially once the cross panel is located in its final mounted position with respect to the supporting panel as shown in Figs. 3 and 4. According to this aspect the channel section is made from a resilient plastic material and the mounting edge is cut such that major step portions 13 slide easily within the channel sections up to the point where the forward edge of the minor step of cross panel 10 aligns with the blind ends of the grooves.

However, the stepped mounting edges are cut such that in order to fully slide the supporting panel into position and clear the forward step of the mounting edge by the blind end of the groove, a pulling force must be exerted on the cross panel pulling it slightly away from the supporting panel to permit the minor forward step 15 to ride over ungrooved panel portion 9 between the blind end of the groove and the forward edge 8 of the supporting panel. The resiliency of ridges 23 will permit just enough outward pull of the cross panel for the forward step to clear the blind end of the groove, but will not permit a full withdrawal of the cross panel. Once the cross panel is in its final position on its supporting panel, the memory of the material of the ridges in the channel section pulls the major step portion into the groove while the tight frictional fit between the forward step of the mounting edge and the supporting panel portion 9 attempts to pull the mounting edge out of the groove. These two actions counteract one another to provide an extremely tight secure joint between the two panels.

As mentioned above, the greater the pulling action on the cross panel, the tighter the clamping action by the channel section on the mounting edge due to the dovetail shape of the groove. The self-pulling action of the cross panel is therefore determined by the relative positions of the two steps on the mounting edge and the location of the securing grooves on the main step so that these may be adjusted according to the tightness of fit desired.

Figs. 12 and 13 show a specially designed cross panel having a pair of mounting edges keyed for ease of assembly into a pair of mounting panels. As shown in Fig. 12, the cross panel 100 is provided with a pair of forward minor steps 102 and 104. However, step 104 is approximately twice the length of step 102, whereby major rearward step 103 is longer and terminates closer to the front edge 101 of the cross panel than does major rearward step 105. When the cross panel is fitted into a pair of upright or mounting panels 1, which are identical to those shown in the earlier figures, step portion 103 on the left-hand side of the figure enters its securing channel section prior to step portion 105 being secured. This offset arrangement of the

mounting edges provides in effect a key for easing of assembly, whereby step portion 103 is well-secured and provides a guide for the fitting of step portion 105 into the mounting panel shown on the right-hand side of the figure.

In some finished furniture units it is highly desirable to make the cross panel appear thicker than its actual thickness. This can be achieved by V grooving to provide a false front on the cross panel as shown on Figs. 5 through 7, and Figs. 8 through 11.

According to the V grooving method of Fig. 5, the cross panel 30 is constructed from a rigid cuttable material 32 such as wood or fibre board and a resilient covering layer 34 of vinyl material or the like. The stepped mounting edge 36 consists of a major step portion 38 and the minor forward step portion 40 which is formed by portions 45, 46 and 50, as will be described later in greater detail. The major step portion is provided with small longitudinal grooves 42 extending the entire length of the major step.

The minor step of the mounting edge is prepared by cutting V grooves 44 and 48 on either side of portion 46. These V grooves extend all the way through the wooden layer 32 of the cross panel and terminate at the vinyl layer 34. The grooves are not cut into the vinyl layer. Portions 50 and 46 are then folded against portion 45 as shown in Fig. 6 and secured in position by a suitable adhesive to provide front edge 52 on the cross panel. The flexibility of the vinyl layer permits the folding of the portions to provide the front edge which is twice as thick as the main body of the cross panel behind the front edge. However, when the cross panel is inverted and fitted in position on the furniture piece shown in Fig. 7, it appears from the front and the top of the furniture piece that the entire cross panel is of the same thickness as that of the false front 52.

The method of assembling the furniture unit shown in Fig. 7 is identical to that described with respect to Figs. 1 through 4 and the same frictional tightening fit may be provided between the minor forward step 40 and un-grooved portion panel 9 intervening between the front edge of the supporting panels and the blind ends of the grooves. According to the V grooving method, the cross panel not only appears to be thicker than it actually is, but is additionally supported by the increased depth provided by the folding of portions 45, 46 and 50, which acts as a supporting bracket to the cross panel.

It should be noted that the recessing of the major step 38 from the extreme forward edge of the cross panel makes the present invention particularly suitable for V grooving, because it is completely hidden by the blind end of the groove so that the different thicknesses in the cross panel can only be determined by exam-

ining the cross panel from beneath or by withdrawing from the grooves.

Figs. 8 through 11 show a cross panel 60 having a single V groove 62 at one end between portions 64 and 66. Again, the panel is of a wooden construction with a vinyl cover and the V groove cut into the wood but not into the vinyl. The panel is folded and secured as shown in Fig. 9 such that portions 64 and 66 provide the forward step of the mounting edge of the cross panel. The cross panel is mounted to supporting panels 1 as shown in Fig. 10 in the same manner as earlier described. However, in this instance, as can be seen in Fig. 11, cross panel 60 is V grooved at each end. This, in combination with the extended length of portions 66 provides an extremely strong joint which in effect is supported by L-shaped bracket members provided by the panel itself without requiring additional supporting brackets. Such an arrangement is capable of supporting extremely heavy loads whether used in combination with one or two supporting panels.

A further arrangement which provides a finished furniture joint is shown in Figs. 14 through 16. According to this arrangement, the cross panel does not include a step mounting edge but rather the mounting panels are specifically designed to hide the forward end of the grooves in which the cross panel is mounted. Accordingly, the mounting panel 70, preferably covered with a vinyl exterior 71, is V-grooved as shown at 74. The dovetail joint which cannot be seen in Fig. 14 extends through the mounting panel as far as lip 72 and terminates at that point in advance of the V grooves. Forwardly of lip 72 is a small plateau portion 73. A second plateau portion 78 is found immediately behind the extreme forward edge 79 of the mounting panel. On the opposing side of the mounting panel from plateau portion 78 is a flat portion 80 which is slightly longer than the maximum width of the mounting panel, i.e. the length across the end 79.

After the mounting panel has been appropriately grooved, it is folded, as shown in Fig. 15, such that flat portion 80 now forms the front edge of the mounting panel. Since, as mentioned above, this flat edge is slightly greater than the maximum width of the mounting panel prior to folding, the dovetail groove which extends only as far as lip 72 is now covered and completely hidden at the front of the mounting panel. Therefore, the cross panel need not be provided with a stepped mounting edge and when a cross panel, as indicated at 88 in Fig. 16, is fitted between a pair of mounting panels 70, both the dovetail grooves and the channel sections in those grooves are hidden on the front surface of the structure to again provide a finished furniture joint. This arrangement is particularly suitable for use with a door 90,

hinged at 92, used to completely close the front of the structure.

- The present invention includes a number of highly desirable advantages over the prior art which will be understood from the description above. Firstly, it provides a panel jointing system in which a cross panel is supported by means of a single supporting panel with the securing channel section being completely hidden at the finished or front side of the joint. Secondly, no special tools are required to secure the cross panel in the supporting panel and the supporting panel is usually made such that the channel section is permanently secured in the groove so that the unit may be shipped to the consumer in totally panel form. Furthermore, as opposed to the arrangement in Canadian Patent 991,435, the sharp edges of the channel section are not exposed to the consumer during assembly of the unit, nor are they exposed to damage and breakage during shipping. The V grooving of the present invention provides an aesthetically appealing sturdy unit, without necessitating the additional materials to provide a thick cross panel. The present invention therefore provides an extremely simple and inexpensive panel joint, particularly useful for finished furniture units.
- Although various preferred embodiments of the invention have been described herein in detail, it will be appreciated by one skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.

#### CLAIMS

1. A panel jointing system comprising a supporting panel having a mounting surface provided with an undercut groove which is open at one end only and which extends across a major portion of the mounting surface to a blind end, a cross panel having a mounting edge and a channel section having an exterior shape contoured to the undercut shape of the groove; said channel section being provided with sidewall portions which clampingly engage the mounting edge and which are countersunk in the groove such that when the two panels are joined to one another the channel section is essentially covered by the cross panel and hidden at the blind end of the groove to provide a finished furniture joint.
2. A panel jointing system as claimed in Claim 1 wherein the mounting edge of the cross panel is stepped and includes a minor forward step and a main rearward step and wherein the sidewall portions of said channel section clampingly engage the main rearward step of the mounting edge.
3. A panel jointing system as claimed in Claim 2 including an ungrooved supporting panel portion adjacent to the blind end of said groove with said minor forward step of the

cross panel mounting edge firmly abutting said ungrooved supporting panel portion for enhancing the clamping engagement of said channel section on the main step of said mounting edge.

4. A panel jointing system as claimed in Claim 2 wherein said cross panel is V grooved at its forward end and folded so as to provide a supporting bracket for the cross panel on the supporting panel.

5. A panel jointing system as claimed in Claim 2 wherein said cross panel is V grooved at both its forward and rearward end and folded so as to provide supporting bracket members at each end of the cross panel on the supporting panel.

6. A panel jointing system as claimed in Claim 2 wherein said cross panel is provided with a pair of mounting edges, one of said mounting edges having a minor forward step which is shorter than the minor forward step on the other mounting edge to provide offset major rearward steps on said mounting edges, said offset major rearward steps providing a key effect for guiding said cross panel into engagement with a pair of supporting panels.

7. A panel jointing system as claimed in Claim 1 wherein said supporting panel includes a V grooved portion adjacent to the blind end of the undercut groove, said V grooved portion being folded to provide a lip at the front of the supporting panel which essentially hides both the undercut groove and the channel section when the cross panel is engaged by the supporting panel.

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